Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.TECH. (MECHATRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, DEC 2017

SUBJECT: MANUFACTURING TECHNOLOGY [MTE 3101]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL THE** questions.
- Missing data may be suitably assumed.

1A. What is the difference between station and server with regards to Bottle neck model? **(02)**

1B. Comment on the common types of misalignments observed in torque transmitting units. Explain how to overcome these misalignments.? **(03)**

1C. Explain why a casting may have slightly different shape than the pattern used to make the mold. With neat sketch explain about various allowances provided to compensate the same. **(05)**

2A. What is the significance of anisotropy in sheet metal bending? **(02)**

2B. Both, Honing and Grinding use embedded abrasive tool, but how is that we end up having different surface texture and finish? Also, list the other predominant differences between them. **(03)**

2C. In A rectangular billet Shown in Fig Q2C, A through hole of 6mm diameter need to be cut using CNC mill. Draw a block diagram of the control system used in CNC machine to execute the mentioned operation and discuss in detail about the working principal of the control system and functions of various elements used in the system. **(05)**

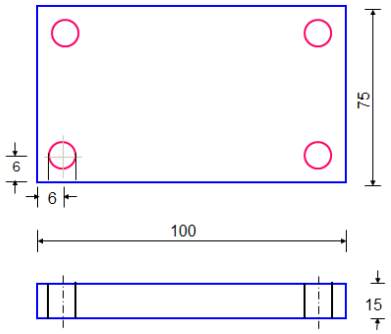

Fig Q2C: Four holes at the corners of the billet (All Dimensions are in mm)

3A. The Fig Q3A(a) illustrates the different components of Military Aircraft. Alloys of Aluminum and Titanium (For example Ti-6Al-4V) are widely used in manufacturing these components. These alloys have very fine grain and exhibit a very large tensile elongation at certain temperature range. Suggest a feasible manufacturing process to manufacture fairing flap of military aircraft. (Shown in Fig Q3A(b)). In detail explain the fundamental principle of the process that you have suggested with the aid of neat sketch and list the advantages and disadvantages of the same. **(05)**

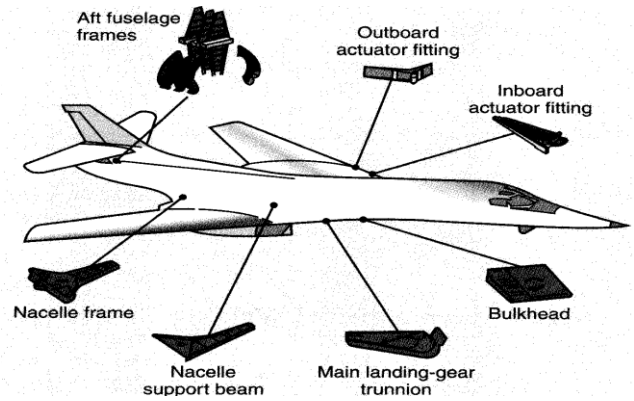

Fig Q3A(a): Different components of Aircraft Fig Q3A(b): fairing flap of aircraft

3B. Write a slot mill CNC program for the profile shown in Fig Q3B taking suitable tool diameter. **(05)**

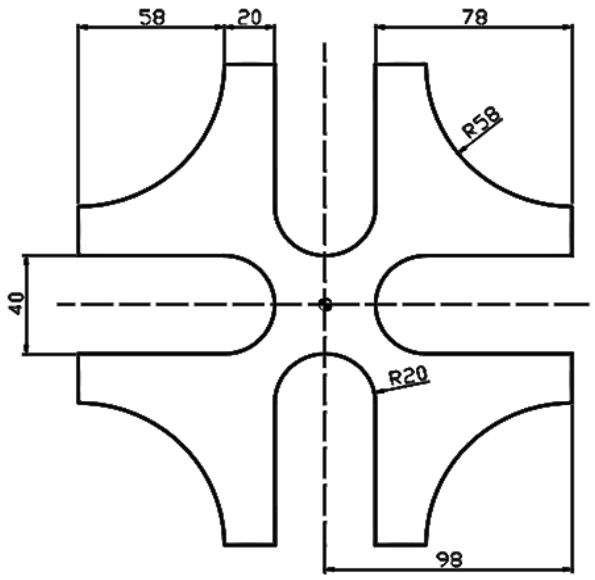

Fig Q3B: Milling Profile

4A. Why there is need of using accumulator in Water Jet Machining (WJM)? With aid of neat sketch explain the working principle of WJM and enumerate its advantages, disadvantages, and application. **(06)**

4B. In Oxyfuel Welding: **(04)**

i) Why acetylene is widely preferred as fuel?

ii) Describe the reactions that take place in oxyacetylene welding and what conclusions you derive from the reaction with respect to its application (usage).

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5A. Comment on the different types of coding scheme structure used in Group Technology(GT) **(03)**

5B. In detail discuss about the different configurations of Direct Numerical Control and represent the architecture of each configuration. **(03)**

5C. In each aisle of an AS/RS, there are 70 storage compartments in the length direction and 10 storage compartments vertically. The dimensions of the unit load in inches (in) are 50 (length), 45 (width) and 50 (height) respectively. The allowances designed for each storage compartment are: x = 8 inch, y = 7 inch and z = 10 inch. Storage depth 'u' in the number of unit load is 3. Determine the capacity per aisle and the dimensions of the single storage system. **(04)**